

**IN THE CLAIMS:**

1 1. (Currently amended) A network device, comprising:

2 bridging logic operative, when enabled, to function as a data link layer bridge  
3 by (i) receiving data link layer messages from first and second communications links  
4 coupled to the network device, the first and second communications links forming  
5 part of a single network-layer network segment, and (ii) forwarding the messages  
6 received from either one of the communications links to the other communications  
7 link;

8 routing logic operative, when enabled, to function as a network layer router by  
9 (i) receiving network layer messages from the first and second communications links,  
10 the first and second network links forming respective different network-layer  
11 network segments, and (ii) selectively forwarding the network layer messages  
12 received from either one of the communications links to the other communications  
13 link based on a routing algorithm and respective network layer network addresses in  
14 the received network layer messages; and

15 selection logic operative during operation of the network device to (i) enable  
16 the bridging logic and disable the routing logic under a first set of operating  
17 conditions, wherein a transition from router operation to bridge operation includes  
18 merging multiple network-layer segments into a bridged network-layer segment, and  
19 (ii) enable the routing logic and disable the bridging logic under a second set of  
20 operating conditions, wherein a transition from bridge operation to router operation  
21 includes dividing a bridged network-layer segment into multiple segments having  
22 distinct routing identities.

1 2. (Currently Amended) A network device ~~according to claim 1~~ comprising:

2 bridging logic operative, when enabled, to function as a data link layer bridge  
3 by (i) receiving data link layer messages from first and second communications links  
4 coupled to the network device, the first and second communications links forming

5 part of a single network-layer network segment, and (ii) forwarding the messages  
6 received from either one of the communications links to the other communications  
7 link;

8 routing logic operative, when enabled, to function as a network layer router by  
9 (i) receiving network layer messages from the first and second communications links,  
10 the first and second network links forming respective different network-layer  
11 network segments, and (ii) selectively forwarding the network layer messages  
12 received from either one of the communications links to the other communications  
13 link based on a routing algorithm and respective network layer network addresses in  
14 the received network layer messages; and

15 selection logic operative during operation of the network device to (i) enable  
16 the bridging logic and disable the routing logic under a first set of operating  
17 conditions, and (ii) enable the routing logic and disable the bridging logic under a  
18 second set of operating conditions,

19 wherein the first set of operating conditions includes the condition that less  
20 than a predetermined number of link numbers are available for use as part of a  
21 network-layer address prefix for one of the communications links.

1 3. (Currently Amended) A network device according to claim 2-4, wherein the second  
2 set of operating conditions includes the condition that the number of nodes residing  
3 on the first and second communications links collectively exceeds a predetermined  
4 threshold number.

1 4. (Original) A network device according to claim 3, wherein the selection logic is  
2 operative to track the number of nodes on the first and second communications links,  
3 and to autonomously decide to enable the routing logic and disable the bridging  
4 logic.

1 5. (Currently Amended) A network device according to claim 2-4, wherein the  
2 selection logic is operative to autonomously determine whether the first set of  
3 operating conditions are met.

1 6. (Currently Amended) A network device according to claim 2-4, wherein the  
2 selection logic is operative to cooperate with another network device in a common  
3 network region in determining whether the first set of operating conditions are met.

1 7. (Currently Amended) A network device according to claim 2-4, wherein the  
2 determination of whether the first set of operating conditions are met is made by a  
3 separate network device in a common network region, and wherein the selection logic  
4 is operative to enable the bridging logic and disable the routing logic in response to a  
5 control message received from the separate network device.

1 8. (Currently Amended) A network device according to claim 2-4, wherein (i) the  
2 first and second communications links are part of a group of three or more  
3 communications links coupled to the network device with respect to which bridging  
4 and routing functionality can be selected, (ii) the selection logic is further operative  
5 in accordance with a predetermined selection algorithm to select the communications  
6 links in the group that are to have their respective routing and bridging functions  
7 enabled and disabled.

1 9. (Original) A network device according to claim 8, wherein the predetermined  
2 algorithm for selecting communications links under the first set of operating  
3 conditions includes selecting a pair of communications links collectively having  
4 fewer attached nodes than any other pair of communications links in the group.

1 10. (Original) A network device according to claim 8, wherein the predetermined  
2 algorithm for selecting communications links under the second set of operating  
3 conditions includes selecting the communications links included in the network

4 segment having more attached nodes than any other network segment defined by  
5 communications links in the group.

1 11. (Currently Amended) A method of operating a network device, comprising:

2 performing the function, when enabled, of a data link layer bridge by (i)  
3 receiving data link layer messages from first and second communications links  
4 coupled to the network device, the first and second communications links forming  
5 part of a single network-layer network segment, and (ii) forwarding the messages  
6 received from either one of the communications links to the other communications  
7 link;

8 performing the function, when enabled, of a network layer router by (i)  
9 receiving network layer messages from the first and second communications links,  
10 the first and second network links forming respective different network-layer  
11 network segments, and (ii) selectively forwarding the network layer messages  
12 received from either one of the communications links to the other communications  
13 link based on a routing algorithm and respective network layer network addresses in  
14 the received network layer messages; and

15 operation of the network device, (i) enabling the bridge function and disabling  
16 the router function under a first set of operating conditions, and (ii) enabling the  
17 router function and disabling the bridge function under a second set of operating  
18 conditions,

19 wherein the first set of operating conditions includes the condition that less  
20 than a predetermined number of link numbers are available for use as part of a  
21 network-layer address prefix for one of the communications links.

1 12. (Currently Amended) A computer program product including a computer readable  
2 medium, the computer readable medium having a network router/bridge program  
3 stored thereon for execution in a computer functioning as a network node, the  
4 network router/bridge program comprising:

5 program code operative, when enabled, to function as a data link layer bridge  
6 by (i) receiving data link layer messages from first and second communications links  
7 coupled to the network node, the first and second communications links forming part  
8 of a single network-layer network segment, and (ii) forwarding the messages received  
9 from either one of the communications links to the other communications link;

10 program code operative, when enabled, to function as a network layer router  
11 by (i) receiving network layer messages from the first and second communications  
12 links, the first and second network links forming respective different network-layer  
13 network segments, and (ii) selectively forwarding the network layer messages  
14 received from either one of the communications links to the other communications  
15 link based on a routing algorithm and respective network layer network addresses in  
16 the received network layer messages; and

17 program code operative during operation of the network node to (i) enable the  
18 bridge program code and disable the router program code under a first set of  
19 operating conditions, and (ii) enable the router program code and disable the bridge  
20 program code under a second set of operating conditions,

21 wherein the first set of operating conditions includes the condition that less  
22 than a predetermined number of link numbers are available for use as part of a  
23 network-layer address prefix for one of the communications links.

1 13. (Currently Amended) A computer data signal including a network router/bridge  
2 program for execution in a computer functioning as a network node, the network  
3 router/bridge program comprising:

4 program code operative, when enabled, to function as a data link layer bridge by (i)  
5 receiving data link layer messages from first and second communications links coupled to  
6 the network node, the first and second communications links forming part of a single  
7 network-layer network segment, and (ii) forwarding the messages received from either one  
8 of the communications links to the other communications link;

9           program code operative, when enabled, to function as a network layer router by (i)  
10 receiving network layer messages from the first and second communications links, the first  
11 and second network links forming respective different network-layer network segments, and  
12 (ii) selectively forwarding the network layer messages received from either one of the  
13 communications links to the other communications link based on a routing algorithm and  
14 respective network layer network addresses in the received network layer messages; and  
15           program code operative during operation of the network node to (i) enable the bridge  
16 program code and disable the router program code under a first set of operating conditions,  
17 and (ii) enable the router program code and disable the bridge program code under a second  
18 set of operating conditions,  
19           wherein the first set of operating conditions includes the condition that less  
20 than a predetermined number of link numbers are available for use as part of a  
21 network-layer address prefix for one of the communications links.

1   14. (Currently Amended) A network device, comprising:

2           means for functioning, when enabled, as a data link layer bridge by (i) receiving data  
3 link layer messages from first and second communications links coupled to the network  
4 device, the first and second communications links forming part of a single network-layer  
5 network segment, and (ii) forwarding the messages received from either one of the  
6 communications links to the other communications link;

7           means for functioning, when enabled, as a network layer router by (i) receiving  
8 network layer messages from the first and second communications links, the first and second  
9 network links forming respective different network-layer network segments, and (ii)  
10 selectively forwarding the network layer messages received from either one of the  
11 communications links to the other communications link based on a routing algorithm and  
12 respective network layer network addresses in the received network layer messages; and

13           means operative during operation of the network device for (i) enabling the bridge  
14 function and disabling the router function under a first set of operating conditions, and (ii)

15 enabling the router function and disabling the bridge function under a second set of  
16 operating conditions,  
17 wherein the first set of operating conditions includes the condition that less  
18 than a predetermined number of link numbers are available for use as part of a  
19 network-layer address prefix for one of the communications links.